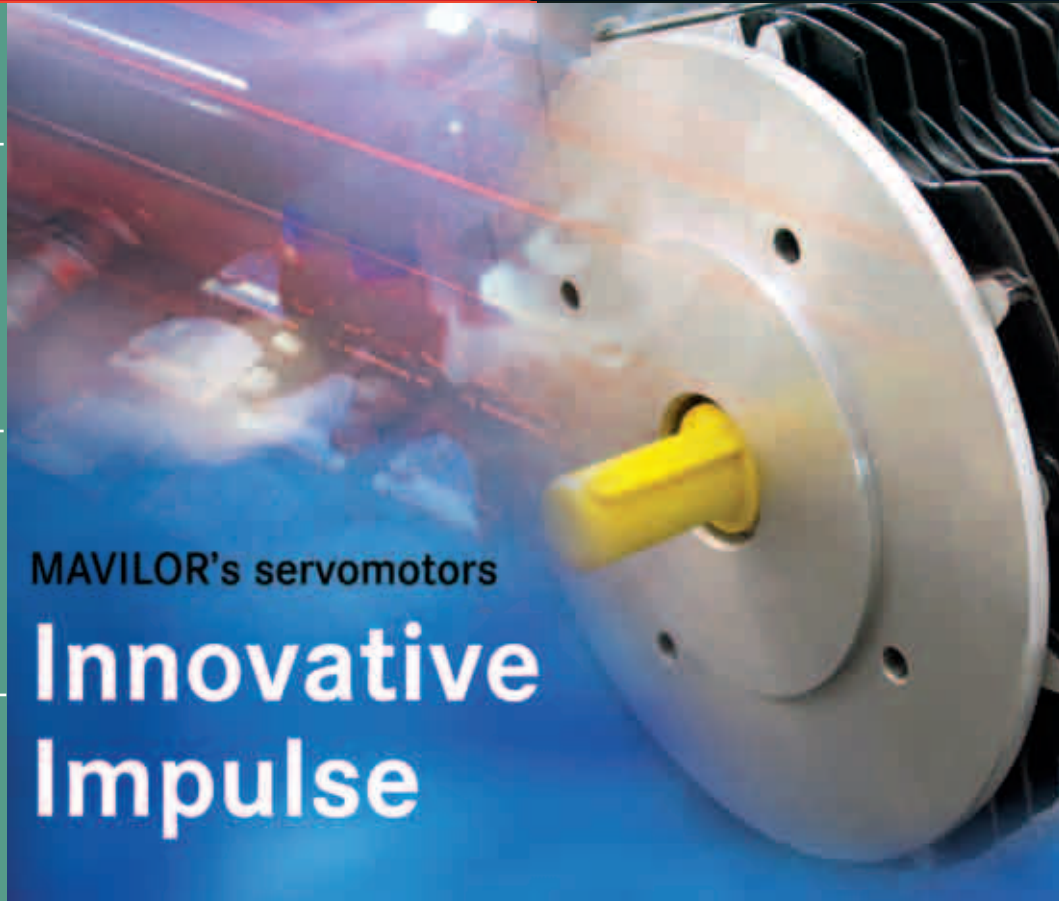


1 Introduction.

2 Comparison of ripple motors with and without cogging by Enric Ciurana.

3 Mavilor power-speed chart by Enric Solsona.

4 Our Distributors.



MAVILOR's servomotors

Innovative Impulse

Introduction

In this month's issue we are featuring an article by Enric Ciurana. He shares with us the results of a test done by Infranor Spain which compares ripple motors with and without cogging. Mr. Ciurana's article offers readers several graphics including test conditions and statistics that clearly exhibit his findings. The client chose Mavilor Motors. Afterwards, this test was done in order to optimize their application.

Another feature of this month's issue is a commentary by Enric Solsona about the criteria for choosing the appropriate motor for a company's needs. He also provides two charts that demonstrate his point. These graphs show the appropriate motor required, by looking at speed and power output, rather than simply in terms of power as is done in many countries in Asia.

We would like to take this opportunity to remind readers that this monthly news forum is open to all of Mavilor's extensive network of clients and collaborators. It is a chance for our readers to get to know us better. In addition, we appreciate the contribution of your comments and experiences.

Thank you,
The Mavilor Team.



Comparison of ripple motors with and without cogging

by Enric Ciurana Mavilor Motors

Introduction

In the following article we show the test done by Infranor Badalona with an application for the testing machinery.

This client opted for the Mavilor motors and did this test to optimize the application of the client. It compares the Mavilor motors BLS-55 and MLL-55.

	BLS-55	MLL-55
Max. Mechanical Speed (RPM)	10000	10000
Stall Torque (Nm)	0.7	0.96
Peak torque (Nm)	2.8	3.5
Torque-Weight ratio (Nm/kg)	0.5	0.59
EMF Constant (Vs/rad)	0.29	0.22
Torque Constant (Nm/A)	0.5	0.38
Reluctance Torque (%Nm)	<4%	0
Winding Resistance(Ohms)	14.7	7.5
Winding Inductance (mH)	18.6	2.3
Rotor Inertia (Kgm ² .10 ⁻³)	0.017	0.066
Mechanical Time Constant (ms)	1.72	5.9
Electrical Time Constant (ms)	1.27	0.31
Thermal Time Constant (s)	1120	1162
Thermal Resistance (°C/W)	1.99	1.31
Mass (kg)	1.4	1.5
Radial Load (N)	250	
Axial Load (N)	100	
Insulation	Class-F	
Dimensions	57x57x142mm	

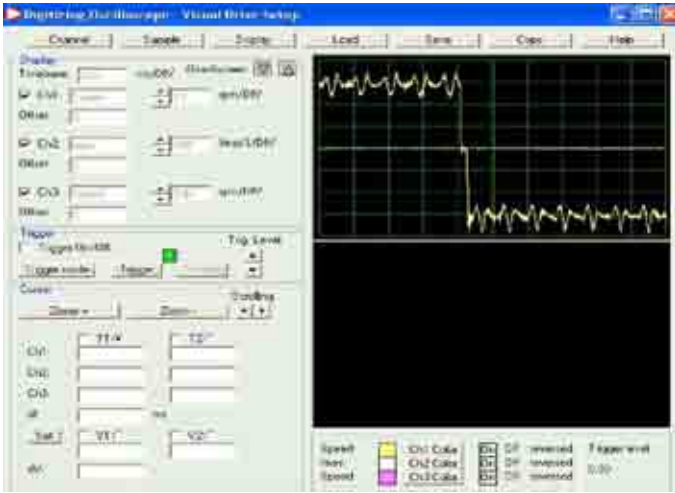
General characteristics

In the following graphics, the advantages are clearly shown at the level of ripple and current and as a consequence velocity ripple, of the use of the motors without Cogging MLL, compared to the classic BL motors.

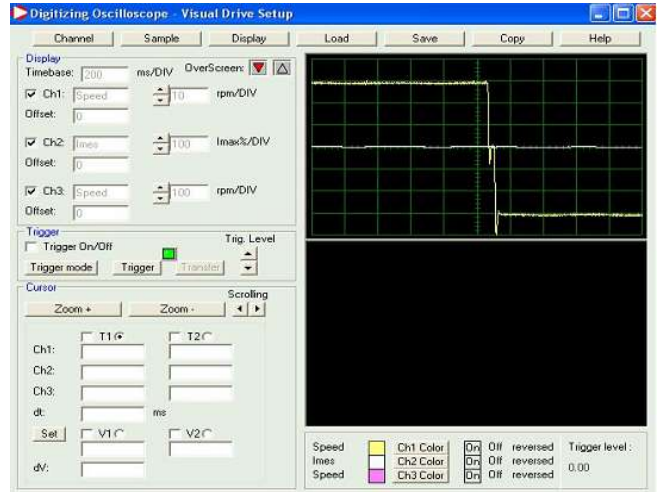
In the test, two distinct amplifiers were used, to rule out intrinsic characteristics of some of them as far as regulation; the SMTBD1m and the CD1m of Infranor Lourdes, and two similar motors with regard to dimensions, and standard model BLS-55 and one without Cogging, MLL-55.

Conclusions

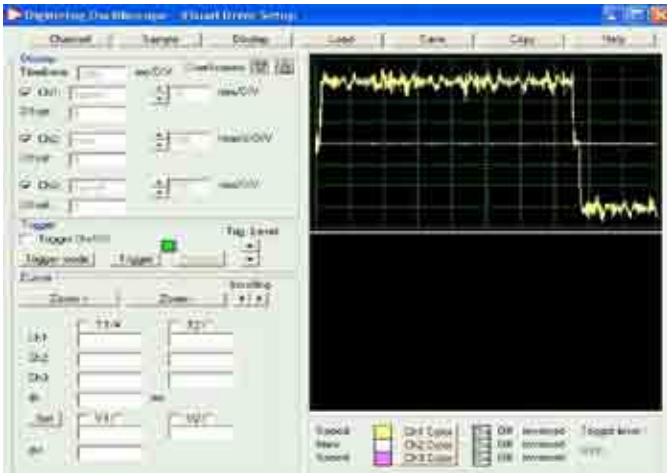
In the graphics shown, it is clearly seen that in the case of the motor BLS-55 the ripple of velocity obtained is from 5 to 10 rpm, compared to the MLL-55 in the same scale of values, the ripple reached is immeasurable.



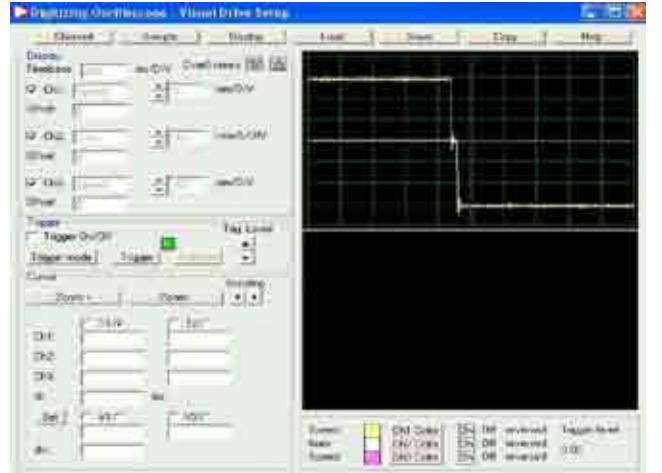
SMTBD1m 220/04 (16Bits) MOTOR BLS-55
 Parameters: P=38 I=1.5 PG=0.1 FF=1
 Slow pass=1000 rpmMax=100



SMTBD1m 220/04 (16Bits) MOTOR MLL-55
 Parameters: P=92 I=4.9 PG=0.0375 FF=1
 Slow pass=640 rpmMax=100



CD1pm 220/10.5 (16Bits) MOTOR BLS-55
 Parameters: P=20 I=1.5 PG=0.1 FF=1 Slow
 pass=1000 rpmMax=100



CD1pm 220/10.5 (16Bits) MOTOR MLL-55
 Parameters: P=45 I=2.41 PG=0.1 FF=1 Slow
 pass=640 rpmMax=100

Test condition:

- | | |
|---------------------|-----------------------------|
| Supply voltage | 3x220vac. |
| Offset resolver | Autophasing |
| PI Speed | Autotuning |
| PI Current | CD1 calculate, SMTBD jumper |
| | B1 (BL-55), B3 (MLL-55) |
| Max. Speed | 100rpm |
| Speed Test | 30rpm |
| Load | Without |
| Ambient temperature | 25°C |

Software VDSetup 1.11

Mavilor Power-Speed Chart

by Enric Solsona.

This article was written in order to help translate power in terms of torque and speed specifications, and to find which motor best fits the client's needs

The father of a large family received the medical report from school saying that one of his sons needed to wear glasses. The next day, he bought glasses for all of them just because he wanted to treat all his beloved children with the same care.

Back at work, some servomotor users refer to their servomotor needs in standard terms of power, for instance a 400W motor, or a 600W motor, 1.0 kW motor, and such; like "please give me 2.0 kg of AC brushless servomotor". Then I go and realize that a glass

beveling machine, a cut-to-length application, a scara robot, or an electroerosion machine tool do not work at the same speed, and therefore I can't understand why in South Korea, Japan, China, Taiwan, and sometimes India, some good engineers keep asking

POWER (W)	SPEED in (r. p. m.)								Note: Vs/rad = rpm / 9,55
	500	1000	1500	2000	2500	3000	3500	4000	
100	1,91	0,96	0,64	0,48	0,38	0,32	0,27	0,24	
200	3,82	1,91	1,27	0,96	0,76	0,64	0,55	0,48	
400	7,64	3,82	2,55	1,91	1,53	1,27	1,09	0,96	
500	9,55	4,78	3,18	2,39	1,91	1,59	1,36	1,19	
600	11,46	5,73	3,82	2,87	2,29	1,91	1,64	1,43	
750	14,33	7,16	4,78	3,58	2,87	2,39	2,05	1,79	
1.000	19,10	9,55	6,37	4,78	3,82	3,18	2,73	2,39	
1.500	28,65	14,33	9,55	7,16	5,73	4,78	4,09	3,58	
2.000	38,20	19,10	12,73	9,55	7,64	6,37	5,46	4,78	
2.500	47,75	23,88	15,92	11,94	9,55	7,96	6,82	5,97	
3.000	57,30	28,65	19,10	14,33	11,46	9,55	8,19	7,16	
4.000	76,40	38,20	25,47	19,10	15,28	12,73	10,91	9,55	
4.500		42,98	28,65	21,49	17,19	14,33	12,28	10,74	
5.000		47,75	31,83	23,88	19,10	15,92	13,64	11,94	
6.000		57,30	38,20	28,65	22,92	19,10	16,37	14,33	
7.000		66,85	44,57	33,43	26,74	22,28	19,10	16,71	
8.000		76,40	50,93	38,20	30,56	25,47	21,83	19,10	
9.000			57,30	42,98	34,38	28,65	24,56	21,49	
10.000			63,67	47,75	38,20	31,83	27,29	23,88	
15.000				71,63	57,30	47,75	40,93	35,81	
20.000					76,40	63,67	54,57	47,75	



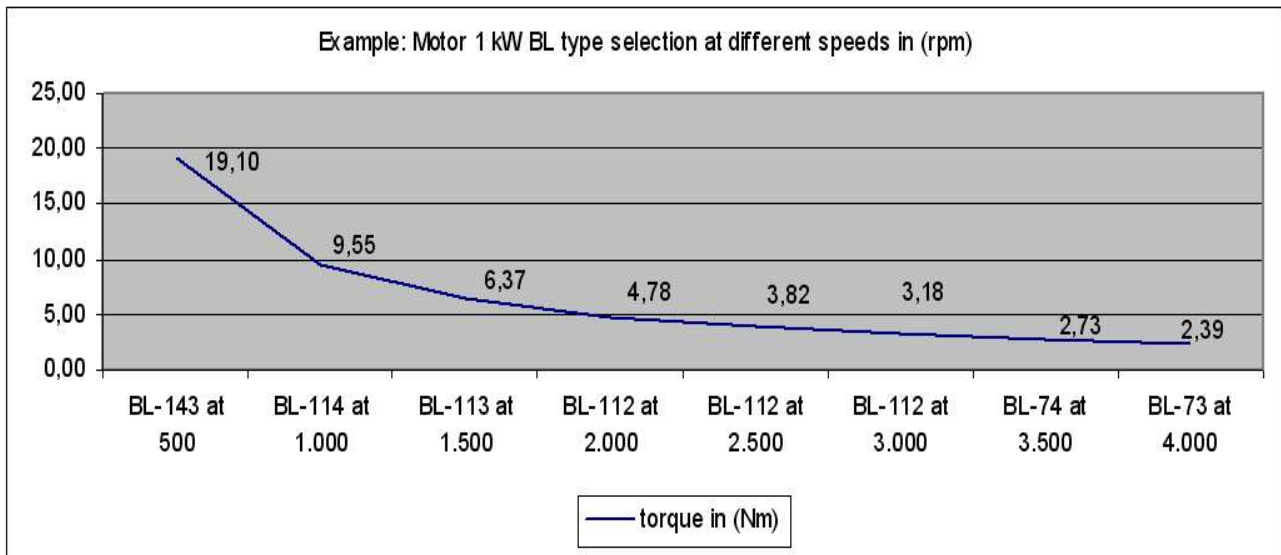
for servomotors in terms of power, only power. Sometimes motors must be selected for the acceleration they are capable of producing, the production output rate they will help deliver, the quality of the waveform, the top speed they can

attain, or the low temperature increase resulting from their use, and optimizing the servo applications sometimes requires a second look, maybe with glasses. In order to help translate the mere power terms in torque and speed

specifications, please find below two charts, one giving the calculated torque value in (Nm) units, the other indicating the suitable MAVILOR motor as a rough approach to the best choice on the next page you can see the result of both charts together.



POWER (W)	SPEED in (r. p. m.)							
	500	1000	1500	2000	2500	3000	3500	4000
100		BL-72	BL-55			BL-40		
200	BL-112	BL-72	BL-55			BL-55		
400	BL-113	BL-112	BL-73	BL-72				
500	BL-114	BL-112	BL-74	BL-72			BL-72	
600	BL-115	BL-113	BL-74	BL-73	BL-72			
750	BL-142	BL-113	BL-74	BL-73	BL-72			
1.000	BL-143	BL-114	BL-113	BL-112	BL-74			
1.500	BL-144	BL-142	BL-114	BL-113				
2.000	BL-191	BL-143	BL-115	BL-114	BL-113			
2.500	BL-191	BL-143	BL-142	BL-115	BL-113			
3.000	BL-191	BL-144	BL-141	BL-113				
4.000	BL-192	BL-144	BL-141	BL-115				
4.500		BL-144	BL-143	BL-142	BL-141			
5.000		BL-144	BL-143	BL-142				
6.000		BL-192	BL-144	Special winding on request				
7.000		BL-192	BL-191	BL-144	Special winding on request			
8.000		BL-192	BL-191	BL-144	Special winding on request			
9.000		BL-192	BL-191	BL-144	Special winding on request			
10.000		BL-192	BL-191	BL-144	Special winding on request			
15.000			BL-192	BL-192	Special winding on request			
20.000				BL-192	Special winding on request			



In this third image you will see the two charts superimposed, giving us the appropriate motor torque resulting from the calculation power divided speed (in rad/s)

POWER (W)	SPEED in (r p m.)								Note: Vs/rad = rpm / 9.55
	500	1000	1500	2000	2500	3000	3500	4000	
100	1.81	0.90	0.64	0.48	0.38	0.32	0.27	0.24	
200	3.62	1.81	1.27	0.96	0.76	0.64	0.55	0.48	
400	7.24	3.62	2.55	1.91	1.53	1.27	1.09	0.96	
500	9.55	4.78	3.18	2.39	1.91	1.59	1.38	1.19	
600	11.40	5.73	3.82	2.87	2.28	1.91	1.64	1.43	
750	14.33	7.16	4.78	3.58	2.87	2.39	2.05	1.79	
1.000	19.10	9.55	6.37	4.78	3.82	3.18	2.73	2.39	
1.500	28.65	14.33	9.55	7.16	5.73	4.78	4.09	3.58	
2.000	38.20	19.10	12.73	9.55	7.84	6.37	5.48	4.78	
2.500	47.75	23.88	15.82	11.94	9.55	7.84	6.83	5.97	
3.000	57.30	28.65	19.10	14.33	11.48	9.55	8.19	7.16	
4.000	70.40	38.20	25.47	19.10	15.28	12.73	10.91	9.55	
4.500		42.98	28.65	21.49	17.19	14.33	12.29	10.74	
5.000		47.75	31.83	23.88	19.10	15.82	13.64	11.94	
6.000		57.30	38.20	28.65	23.88	19.10	16.37	14.33	
7.000		66.85	44.51	33.43	26.74	22.28	19.10	16.71	
8.000		70.40	50.83	38.20	30.56	25.47	21.83	19.10	
9.000			57.30	42.98	34.38	28.65	24.68	21.49	
10.000			63.67	47.75	38.20	31.83	27.39	23.88	
15.000				71.03	57.30	47.75	40.93	35.81	
20.000					79.40	63.67	54.57	47.75	

Expert knowledge focusing on optimum solutions

MAVILOR's servomotors

Innovative Impulse

High technology in motion control



MAVILOR means optimized solutions

Optimization sums up thirty years of Mavilor's accumulated experience in designing and manufacturing servomotors for every type of motion control.

Our expertise is specifically targeted to the optimization of solutions and results to meet the needs of each client: that means **we always offer you the best technological option, the best integration in the production process and the most cost-effective solution.**

With the endorsement and guarantee of our membership in an international group with a direct presence in the principal geographic areas of the planet.



MAVILOR MOTORS, S.A.
 Polígono Industrial URVASA, c/ Empordà, 11-13
 E- 08130 Santa Perpètua de Mogoda - (Barcelona)
 Tel. +34 93 574 36 90 - Fax: +34 93 574 35 70
 website: www.mavilor.es e-mail: mavilor@mavilor.es

MAVILOR
 INFRANOR GROUP COMPANY

Mavilor around the world



Our Distributors

Argentina	+54 1142225040
Australia	+61 733974575
Austria	+43 225271110
Brazil	+55 152283730
Chile	+56 2450 4200
China/Beijing	+86 10 8208 0369
China/Shanghai	+86 21 5435 4316
China/Guangzhou	+86 20 8759 1568
Czech Republic	+420 261123187
Denmark	+45 43718088
France	+33169633515
Germany	+49 6181180120
Greece	+30 3105566239
Holland	+31 186 610 155
Hungary	+36 1265 0677
India	+91 222 2872211
Iran	+98 2139 30203
Israel	+972 36470471
Italy	+39 0266200980
Japan	+81 3 5298 2700
Korea	+82 27852262
Malaysia	+60 52538555
Mexico	+52 55 5696 3932
Norway	+47 22335301
Russia	+7 095 9135161
South Africa	+27 114681881
Spain	+34 934601631
Sweden	+46 21 24860
Switzerland	+41 22 960 70 70
Taiwan	+886 229145767
Turkey	+90 216 641 6884
United Kingdom	+44 1522699500
United States	+1 2037298258